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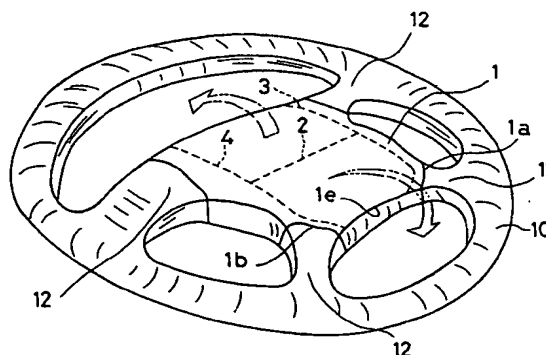
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(54) **MODULE COVER OF AIR BAG.**

(57) A module cover (1) of an air bag permitting a large deformation of the flap when the air bag inflates and enabling quick inflation of the air bag in all the directions, which is provided with tear lines (2, 3, 4) and parts engaging with a steering spoke (12) at the sides of the bag, wherein the ends of the tear lines (3, 4) extend along the engaging parts.

FIG. 1



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TECHNICAL FIELD

The present invention relates to a modular cover for use in an air bag assembly and particularly, to a modular air bag cover rupturable so that flaps may easily and largely be bent to provide for full deployment of an air bag.

BACKGROUND ART

As shown in Fig. 4, an air bag assembly is disposed centrally on a vehicle steering wheel 10 to sense impact or deformation upon collision of a vehicle so as to deploy and inflate an air bag. This air bag assembly includes a mounting plate, commonly referred to as a retainer. An inflator and an air bag are mounted to the mounting plate and covered by a modular cover 11. As shown in Fig. 5, the modular cover 11 has engaging portions 11a, 11b at its lateral sides to join spokes 12 of the steering wheel.

The modular cover 11 has tear lines 13 along which the modular cover can be ruptured when the air bag is deployed. The tear lines are in the form of a continuous groove or a semicontinuous groove. The tear lines may alternatively include spaced grooves of greater depth. When the cover has two different layers, a rigid layer and a soft layer, a slit may be formed in the rigid layer so that the cover may be ruptured along a predetermined line.

In the prior art modular cover 11, the tear lines 13 include tear lines 13a, 13b extending vertically along lateral side of the cover 11, and a central tear line 13c extending centrally and laterally of the cover 11 as shown in Figs. 4 and 5. A vertical direction is a direction from an occupant M toward a windshield G. A lateral direction is the width direction of a vehicle. In this case, the steering wheel is so oriented as to permit the vehicle to run on a straight line.

The tear lines 13a, 13b of the prior art modular cover 11 have one ends P positioned substantially at the center of the engaging portions 11a, 11b of the modular cover 11 to join spokes 12. The modular cover 11 has portions S which extend from the one ends P to the lower ends of the engaging portions 11a, 11b and remain unbroken when the cover 11 is ruptured. As a consequence, a flap (lower flap) of the modular cover 11 adjacent to the occupant is bent along a line P-P. A portion of the modular cover around the line P-P has a relatively high bending rigidity. This may prevent large bending of the lower flap.

DISCLOSURE OF THE INVENTION

It is an object of the present invention to solve

the problem encountered in the prior art and to provide a modular cover for use in an air bag assembly, which can fully rupture to allow an air bag to be very easily inflated in all directions.

The present invention provides a modular cover for use in an air bag assembly comprising tear lines along which the cover can rupture, and engaging portions at its lateral sides to join spokes of a steering wheel, wherein the tear lines have one ends extending along the engaging portions.

In the modular air bag cover of the present invention the ends of the tear lines extend along the engaging portions. Thus, the modular cover can be ruptured along the engaging portions to provide a fully bent flap when the air bag assembly is actuated.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a perspective view of a steering wheel on which a modular cover for an air bag assembly according to one embodiment of the present invention is mounted;

Fig. 2 is a front view of the steering wheel;

Fig. 3 is a perspective view of the modular cover;

Fig. 4 is a perspective view of a steering wheel on which a conventional modular cover is mounted;

Fig. 5 is a perspective view of the conventional modular cover; and

Fig. 6 is a perspective view of a modular cover according to another embodiment of the present invention.

BEST MODE FOR CARRYING OUT THE INVENTION

The present invention will now be described in more detail, by way of example, with reference to the drawings.

Fig. 1 is a perspective view of a steering wheel on which is mounted a modular cover for an air bag assembly, made according to one embodiment of the present invention. Fig. 2 is a front view of the steering wheel. Fig. 3 is a perspective view of the modular cover. In Figs. 1 and 2, 10 is a steering wheel, and 12 are spokes.

Referring to Figs. 1 to 3, a modular cover 1 is substantially rectangular in shape and includes a central tear line 2 and side tear lines 3, 4 all rupturable when an air bag is deployed. The central tear line 2 extends centrally across the cover 1. The tear lines 3, 4 extend vertically along lateral sides of the cover 1 adjacent to its edges. The central tear line 2 and the tear lines 3, 4 are connected together. Engaging portions 1a, 1b are formed at the lower portion of the cover 1 to join

the spokes 12 of the steering wheel and terminate at an upper edge 1e of the cover.

The modular cover 1 thus constructed is reaptured to the edge 1e when the air bag is deployed. The edge 1e of the cover is less in flexural rigidity than a portion of the cover around the line P-P (see Figs. 4 and 5). Thus, when the cover is reaptured to provide a lower flap (surrounded by a broken line extending from a point A to a point F through points B to E), this lower flap can easily and largely be bent from the upper edge 1e (line extending between the point A and the point F) of the modular cover. This results in rapid and large deployment of the air bag in all directions.

Fig. 6 illustrates another embodiment.

In a modular cover 1A shown in Fig. 6, the tear lines 3, 4 extend along the engaging portions 1a, 1b and across one side 1c of the cover and terminate at a lower edge 1d of the cover. The other structure of the modular cover 1A is identical to that of the modular cover 1 shown in Figs. 1 to 3.

Also, in the modular cover 1A, the tear lines 3, 4 extend along the engaging portions of the cover and terminate at the edge 1d. Thus, the modular cover can be reaptured to the edge 1d to provide for large and rapid bending of the lower flap when the air bag is deployed. This allows the air bag to be rapidly and substantially inflated in all directions.

In the present invention, the tear lines 3, 4 may terminate at a point between the edges 1e and 1d.

INDUSTRIAL APPLICABILITY

As is clear from the foregoing embodiments, the modular cover of the present invention is reaptured at least to its upper edge when the air bag is deployed. The resulting flap can be largely deformed to rapidly and substantially inflated the air bag in all directions. This enables soft inflation.

Claims

1. A modular cover for use in an air bag assembly comprising tear lines along which said modular cover can reapture, and engaging portions at its lateral sides to join spokes of a steering wheel, wherein said tear lines have one ends extending along said engaging portions.
2. The modular cover of claim 1, wherein said tear lines comprises a first tear line (2) extending centrally across the modular cover (1), and a second tear line (3) connected to one end of said first tear line (2) and extending transversely of said first tear line (2), and a third tear line (4) connected to the other end of said first tear line (2) and extending transversely of

said first tear line (2), said second tear line (3) and said third tear line (4) extending along said engaging portions joined to said spokes.

3. The modular cover of claim 2, wherein said modular cover 1 is in the form of a shallow box and has an upper edge (1e), and said second tear line (3) and said third tear line (4) terminate at the upper edge (1e) of the box.
4. The modular cover of claim 2, wherein said modular cover 1 is in the form of a shallow box and has a lower edge (1d), and said second tear line (3) and said third tear line (4) terminate at the lower edge (1d) of the box.

FIG.1

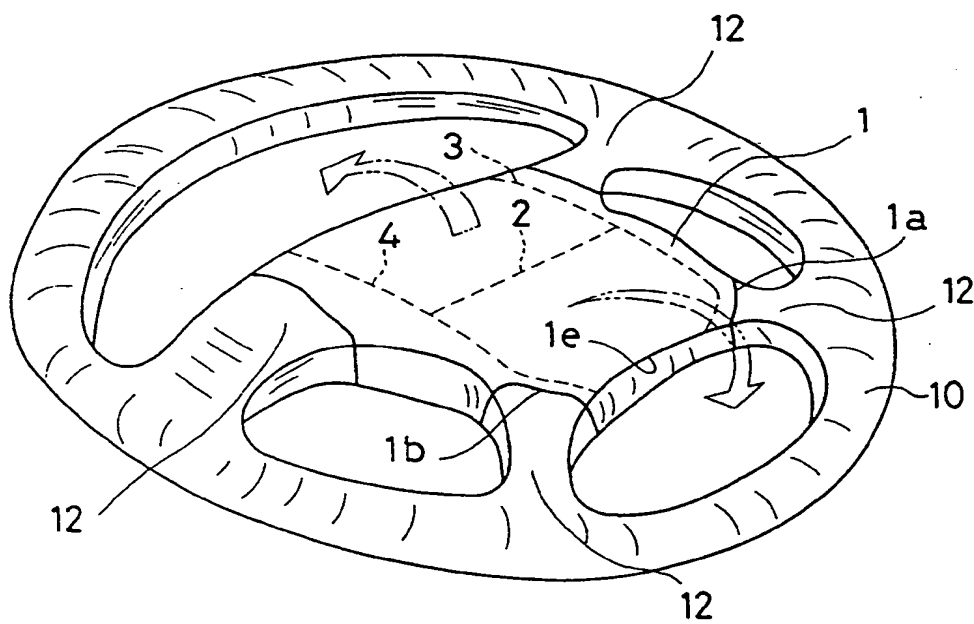


FIG. 2

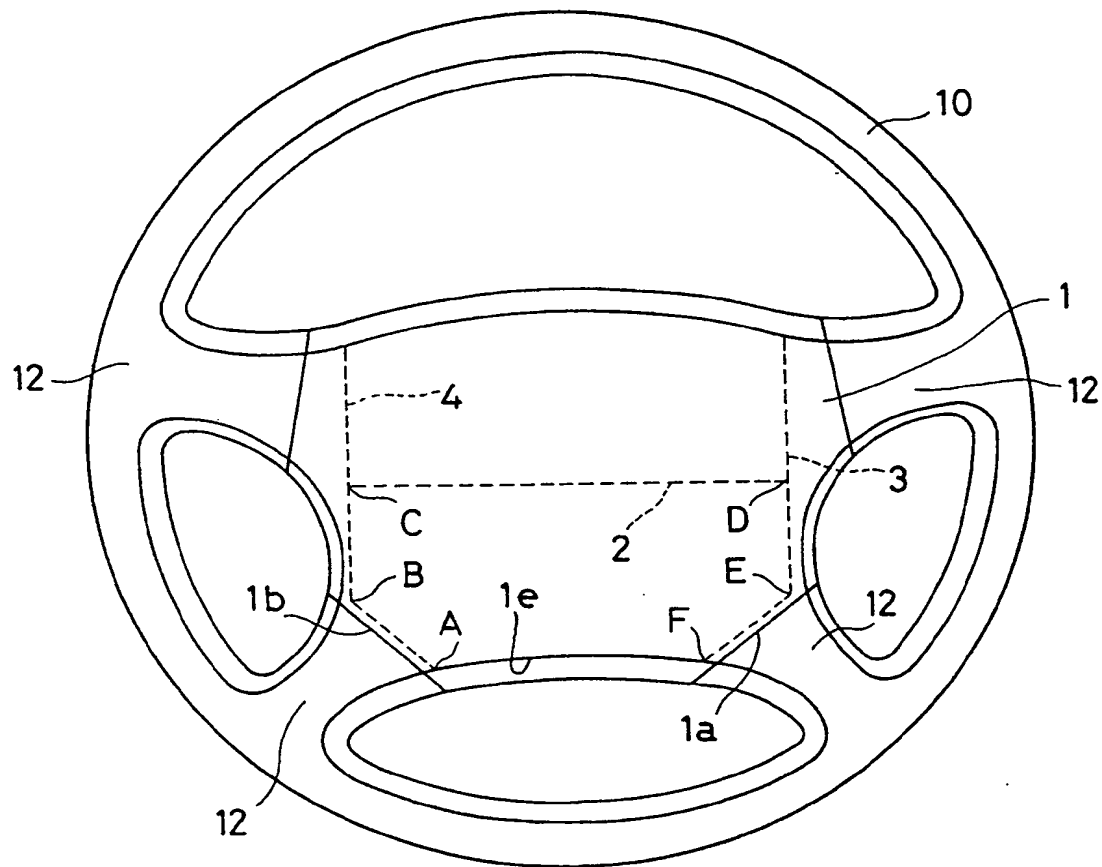


FIG. 4

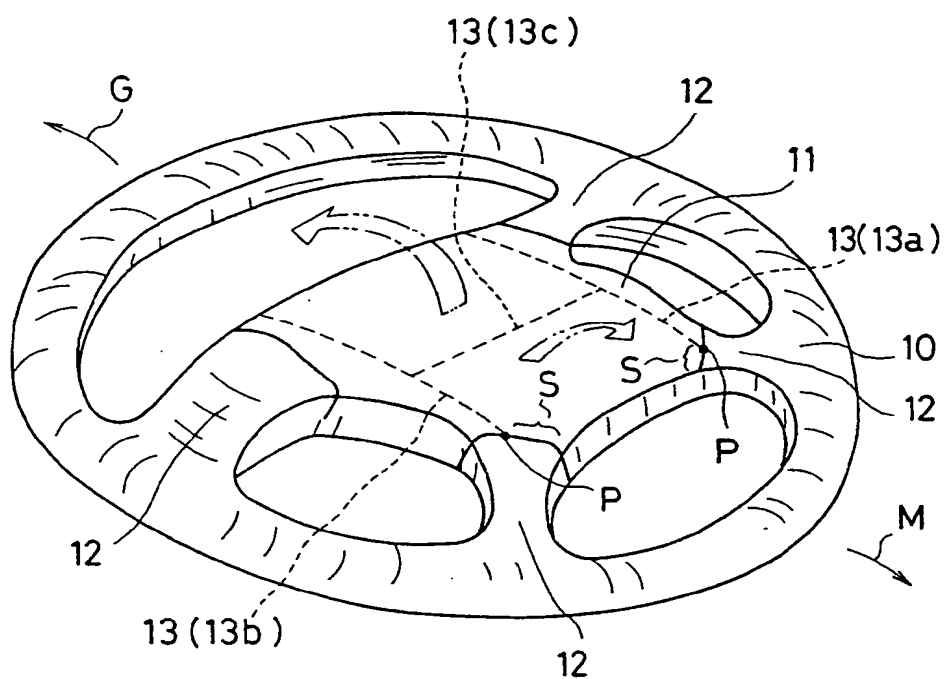


FIG.3

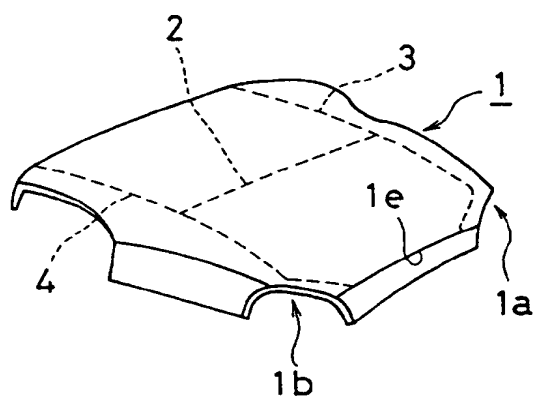


FIG.5

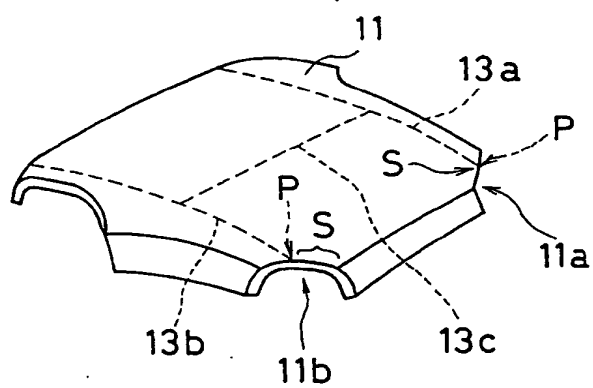
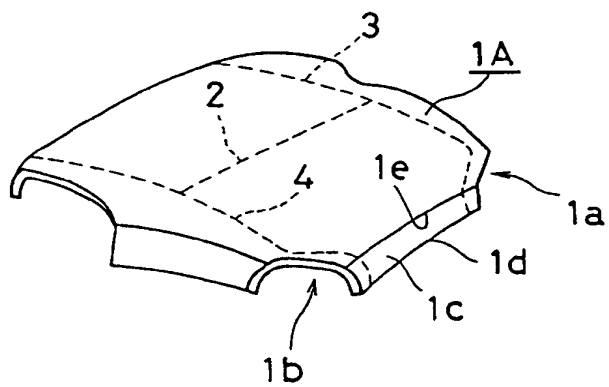


FIG.6



INTERNATIONAL SEARCH REPORT

International Application No PCT/JP91/00810

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all) *		
According to International Patent Classification (IPC) or to both National Classification and IPC		
Int. Cl ⁵ B60R21/20		
II. FIELDS SEARCHED		
Minimum Documentation Searched ⁷		
Classification System ¹	Classification Symbols	
IPC	B60R21/20	
Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched ⁴		
Jitsuyo Shinan Koho 1972 - 1990 Kokai Jitsuyo Shinan Koho 1971 - 1990		
III. DOCUMENTS CONSIDERED TO BE RELEVANT ³		
Category ⁶	Citation of Document, ¹¹ with indication, where appropriate, of the relevant passages ¹²	Relevant to Claim No. ¹³
P	JP, U, 2-91052 (Toyota Motor Corp., Tokai Rika Denki Seisakusho, K.K.), July 19, 1990 (19. 07. 90), (Family: none)	1-4
P	JP, U, 2-143250 (Toyota Motor Corp., Toyoda Gosei Co., Ltd.), December 5, 1990 (05. 12. 90), (Family: none)	1-3
<p>* Special categories of cited documents: ¹⁰</p> <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier document but published on or after the international filing date</p> <p>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p> <p>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step</p> <p>"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art</p> <p>"S" document member of the same patent family</p>		
IV. CERTIFICATION		
Date of the Actual Completion of the International Search	Date of Mailing of this International Search Report	
August 20, 1990 (20. 08. 91)	September 9, 1991 (09. 09. 91)	
International Searching Authority	Signature of Authorized Officer	
Japanese Patent Office		

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